

### REMARKS

Claims 1-3 and 5-25 are pending in the application. New claims 26 and 27 have been added to the application. Therefore, claims 1-3 and 5-27 are at issue.

Independent claims 1 and 22 have been amended to delete the terms "partially" and "polyols" from the claims. No other amendments are presented.

New claims 26 and 27 recite that the oligoester comprises about 1.4 mole % up to 5 mole % of the one or more saturated triols. These new claims are supported by the specification at page 9, lines 27-29 and at page 17, lines 5-9 (i.e., Example 3), reciting 94.8 g (0.80 moles) 1,6-hexanediol, 86.8 g (0.60 moles) adipic acid, and 2.6 g (0.02 moles) TMP (trimethylolpropane). Accordingly, the oligoester of Example 3 contains 1.4 mole % of the triol TMP.

Claims 1-25 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite based on the assertion that the term "partially" is a relative term. As noted in applicants' previous response, for this and all other rejections, claim 4 previously was cancelled and claims 1-3 and 5-25 are pending in the application.

Applicants disagree with the Patent Office's (PTO's) assertion for the reasons set forth in previous responses. However, in order to facilitate prosecution, applicants have deleted the term "partially" from the claims. The amount of triol positively recited in the claims indicates that hydroxy-terminated oligoester is branched. The independent claims therefore clearly and definitely set forth the amount of branching by reciting the amount of triol present in the oligoester. Therefore, all claims fully comply with 35 U.S.C. §112, second paragraph, and the rejection should be withdrawn.

Prior to addressing the art-based rejections, applicants point out that the present claims *as a whole positively* recite the presence of a triol, and the reasoning in the Office Action that the claims encompass a branched oligoester that can be free of a triol is incorrect.

First, the independent claims recite that hydroxy-terminated oligoester is *branched*, thereby *requiring* the presence of a triol. By eliminating a triol from the oligoester, the PTO is eliminating a recited feature of the claims. In a case wherein only a diol is used to prepare the oligoester, the oligoester then is linear. This is contrary to the *positively recited* feature of a branched polyester in the independent claims.

Second, the positive recitation of a triol component of the oligoester is present a *second* time in subparagraph (a) of claims 1 and 22. In particular, the independent claims *positively* recite that the oligoester is the reaction product of three reactants including "(ii) one or more of saturated triols" (e.g., claim 1(a)(ii)). The independent claims do not recite that the triol is an optional component, but clearly recite that the triol *is* a reactant in the preparation of the oligoester. The PTO's attempt to completely eliminate this feature from the claims is improper.

Third, the "wherein" clause of claims 1 and 22 recites the maximum amount of triol in the oligoester. Contrary to the PTO's contentions in the Office Action, this amount cannot be zero because of the recitation of a "branched" oligoester *and* the recitation of a triol in claim 1(a)(ii) and claim 22(a)(ii).

The PTO's attention is directed to MPEP §2173.05(c), reciting:

"In a claim directed to a chemical reaction process, a limitation required that the amount of one ingredient in the reaction mixture should "be maintained at less than 7 mole percent" based on the amount of another ingredient. The examiner argued that the claim was indefinite because the limitation sets only a maximum amount and is inclusive of substantially no ingredient resulting in termination of any reaction. The court did not agree because the claim was clearly directed to a reaction process which did not warrant distorting the overall meaning of the claim to preclude performing the claimed process. In re Kirsh, 498 F.2d 1389, 182 USPQ 286 (CCPA 1974)."

The PTO is attempting to distort the present claims in an identical manner.

In addition, the contention in the Office Action that the term "polyol" includes "diols" is incorrect. Applicants previously provided a dictionary definition of the term "polyol," which apparently was ignored by the PTO. Although U.S. Patent No. 4,425,468 defines "polyol" to include "diol," that definition is contrary to the understanding of the term "polyol" in the art. Applicants reserve the right to pursue this deleted subject matter in a continuing application.

Claims 1-3 and 5-25 stand rejected under 35 U.S.C. §103 as being unpatentable over McBain et al. U.S. Patent No. 5,777,053 ('053) in view of Bristow et al. U.S. Patent No. 4,213,837 ('837). Applicants respectfully traverse this rejection.

Applicants' present claims recite a *branched* aliphatic hydroxy-terminated oligoester as a component of the urethane acrylate gel coat resin. In contrast, the '053 patent discloses only *linear* aliphatic polyester intermediates "made from aliphatic dicarboxylic acids or aliphatic anhydrides and glycols" ('053 patent specification, column 2, lines 37-39). Specific glycols and diols are disclosed at column 2, lines 49-55, of the '053 patent. The '053 patent fails to teach or suggest using a triol to form a branched oligoester, either in the specification, including the examples, or the claims.

After reading the '053 patent, a person skilled in the art would have had no incentive to alter the explicit teachings of the reference and provide a branched oligoester as recited in the present claims.

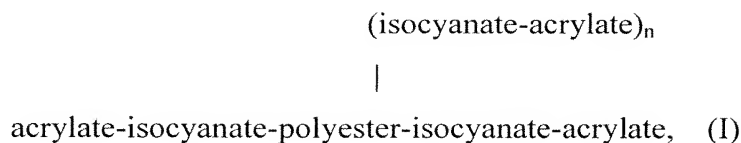
Notably, the '837 patent, like the '053 patent, merely discloses *linear* hydroxy-terminated polyester oligomers, designated as BAHPO. The BAHPO of the '837 patent is disclosed in the structure at column 3, lines 21-37, which clearly depicts a compound having *two* hydroxy groups, i.e., a diol as opposed to a triol. The '837 patent therefore fails to teach or suggest a BAHPO that would yield a branched oligoester, as presently claimed.

In summary, the present claims recite a urethane acrylate gel coat resin having a branched hydroxy-terminated aliphatic oligoester as a component. Branching is achieved by preparing the oligoester using up to 5 mole % of one or more triol, which is not an optional ingredient as contended by the PTO. Neither the '053 patent nor the '837 patent

teaches or suggests such a branched polyester component, and both references are directed solely to linear polyesters. Because the combination of references fails to teach each claimed feature, and because a person skilled in the art would have had no incentive to modify the combined teachings of the references from a linear polyester to a branched polyester, the rejection of pending claims 1-3 and 5-25 over a combination of the '053 and '837 patents under 35 U.S.C. §103 cannot be sustained and should be withdrawn. It is further submitted that new claims 26 and 27, which also are directed to branched oligoesters, are patentable over a combination of the '053 and '837 patents.

Claims 1-3 and 5-25 stand rejected under 35 U.S.C. §103 as being obvious over a combination of Tomotsugu et al. U.S. Patent No. 5,338,613 ('613) in view of the '837 patent. The Office Action relies upon the '613 patent for disclosing a urethane acrylate resin prepared from a hydroxy-functional polyester, a polyisocyanate, and 2-hydroxyethyl (meth)acrylate. The polyester is prepared from a mixture of 60-100% diol and 0-40% triol. The Office Action relies upon the '837 patent, as in the above rejection, for teaching a method of producing a polyester urethane acrylate. The Office Action then asserts that it would have been obvious to combine the '613 and '837 patents and arrive at the presently claimed invention. Applicants traverse this rejection.

The '613 patent discloses that "[t]wo processes are available for synthesizing a urethane acrylate resin" (column 2, lines 64-65). In one process, a urethane acrylate resin is prepared by first providing a polyester ('613 patent, column 2, lines 20-63), which then is reacted with an aliphatic or alicyclic polyisocyanate "to prepare an isocyanate-terminated urethane prepolymer" ('613 patent, column 2, line 66 through column 3, line 9). Then, "by utilizing the residual isocyanate groups of the urethane prepolymer", a 2-hydroxyethyl (meth)acrylate is added ('613 patent, column 3, lines 9-13). An alternative method of preparing the urethane acrylate resin is disclosed at column 3, lines 14-18 of the '663 patent, i.e., addition of 2-isocianoethyl (meth)acrylic to the terminal hydroxyl group of the polyester. By *either* method, the '613 patent teaches a urethane acrylate resin having the following general structure:



wherein n is 0 if triols are omitted and n is 1 or greater if a triol is present.

This method is *exactly* the same method disclosed in the '053 patent cited against the claims, i.e., and previously traversed in Amendment "A", incorporated herein by reference.

In contrast to both the '613 patent and the previously traversed '053 patent, the present claims recite a polyester urethane acrylate reaction mixture that is prepared by a substantially different method, and which provides different reaction products to the method disclosed in the '613 and '053 patents, even *if* the *same* reactants are used. As stated above, the '613 and '053 patents each disclose a polyurethane acrylate resin made by preparing an isocyanate-terminated polyurethane prepolymer, *then* reacting the prepolymer with a hydroxyalkyl acrylate to form the urethane resin.

The differences between a present polyester urethane acrylate reaction mixture and a coating composition of the '053 patent is fully set forth in Amendment "A" at pages 9-11. The present polyester urethane acrylates differ from the urethane acrylic resin of the '613 patent for the same reasons set forth at pages 9-11, Amendment "A", which applicants incorporate herein by reference. Based on the method by which the compound is prepared and the stoichiometry of the reaction, the '613 patent teaches that a resin of formula (I) is essentially the only reaction product made. In contrast, the present gel coat resin is made *via* a different process and yields a composition *comprising* (i) a branched compound of structural formula (I) wherein  $n > 0$ , (ii) a compound of structure formula (I) wherein  $n = 0$ , and (iii) *other* compounds, such as acrylate-isocyanate-acrylate, that simply are not present if the ingredients are reacted according to the method of the '613 patent.

In addition, the '613 patent provides no teaching or suggestion to prepare a presently claimed reaction mixture by completely rearranging the two processes disclosed therein. The '613 patent discloses no problems with the disclosed methods, or the resulting

resin, that would lead a person skilled in the art to even consider altering the method or composition of the '613 patent and arrive at the presently claimed gel coat composition. There is simply no apparent reason provided in the teachings or suggestions of the '613 patent that would lead a person skilled in the art to modify the '613 patent and arrive at the presently claimed invention.

The '837 patent does not overcome the deficiencies of the primary '613 patent. The Office Action relies upon the '837 patent to support a contention of obviousness because the '837 reference discloses three alternative methods of making polyester urethane acrylates (column 5, line 48 through column 6, line 26). The examiner states that a preferred method of the '837 patent "allows for a better control of the exothermic reaction, and minimizes the formation of by-products".

First, the '837 patent is directed to *aromatic* polymers based on bisphenol A. The present claims, and the '613 patent, are directed to *aliphatic* polymers. The control of exotherms and avoidance of by-products referred to in the '837 patent is particularly relevant to aromatic polymers, and such a teaching is not necessarily extendable to aliphatic polymers. For example, it is well known that aliphatic hydroxy groups (e.g., alcohols) and aromatic hydroxy groups (e.g., phenols) can undergo different reactions and via different mechanisms, and can undergo similar reactions differently.

The '837 patent explicitly teaches that the different blending techniques disclosed in the '837 patent to prepare the polymer provide a difference in reaction products, i.e., by-product formation is affected. Therefore, contrary to the PTO's assertion that the primary '613 patent teaches the same polymer as presently claimed, even though made by a different process, the '837 patent teaches that the polymer production process *does* yield different reaction products (column 6, lines 17-26). The '837 patent also teaches that different processes may require "greater care in selecting the amounts of components" (column 6, lines 24-26), which further shows that blending techniques affect the reaction product.

A person skilled in the art would have had no apparent reason to modify the teachings of the '613 patent by using the production method of the '837 patent. The '613

patent provides a specific method of preparing an aliphatic urethane acrylate resin. The '837 patent discloses alternative methods of preparing an aromatic acrylate urethane resin. A person skilled in the art simply would not consider using a method of the '837 patent to prepare a resin of the '613 patent because control of an exothermic is not an issue, and the reaction product would be different, without any predictable benefit.

With respect to claims 13-15, note that the claimed oligoester comprises adipic acid. The '613 patent specifically states that the "acid component of the polyester to be employed in the present invention is *exclusively* an alicyclic dicarboxylic acid" (column 2, lines 26-28). The '613 patent therefore clearly teaches away from claim 13, wherein the polyester contains a linear dicarboxylic acid.

In summary, the '837 patent is directed to linear, aromatic polymers, and methods of preparing aromatic polymers are not necessarily the same as methods of the preparing aliphatic polymers. The '837 patent further teaches that different processes for preparing a polymer results in a different reaction product, which contradicts a contention that the order of addition of reactants does not yield different product mixtures. Applicants therefore respectfully submit claims 1-3 and 5-25 are patentable over a combination of the '613 and '837 patents, and that the rejection should be withdrawn. It is further submitted that new claims 26 and 27 also are patentable over a combination of the '613 and '837 patents.

The Office Action responded to applicants' prior arguments at paragraphs 10-17, pages 5-8. Applicants address various misstatements made in the Office Action:

Paragraphs 11 and 12 of the Office Action – the contentions in this paragraph have been overcome and addressed above. The claims no longer recite "polyols," and the claims do not recite a triol as optional. The triol is a positively claimed component of the oligoester.

Paragraph 13 of the Office Action – the present claims recite different urethane acrylates from the cited '053 patent, as discussed above. The '053 patent is limited to linear oligoesters. The present oligoesters are branched.

Paragraphs 14 and 15 of the Office Action – the present claims do not recite an "n", but clearly recite the amount of triol in the oligoester (5 mol % or less), which inherently dictates the amount of branching. Furthermore, the structure provided in applicants' prior response and copied in the Office Action is merely to illustrate the reaction product in the '613 patent. The "n" has no meaning except for being zero or greater than zero.

Paragraph 16 of the Office Action – applicants' arguments are not unsubstantiated opinion. The contentions in the Office Action refer to isocyanates. Applicants argued that aliphatic *hydroxy* groups (alcohols) react differently from aromatic hydroxyl groups (phenols), as is well known in the art, e.g., phenols are acidic compounds, alcohols are not. As such, applicants' prior comments were not unsubstantiated, and the Office Action is referring to the wrong functional groups (i.e., isocyanate rather than hydroxyl).

Paragraph 17 of the Office Action – the comments relating to adipic acid in the '613 patent are incorrect. The '613 patent teaches *avoidance* of adipic acid. In particular, adipic acid is used in Table 2 of the '613 patent, which are *comparative* examples. See '613 patent, column 6, lines 6-35, i.e., "G through L (Comparative Examples)". The adipic acid-containing composition is Comparative Example I. Testing Comparative Example I showed very poor results ('613 patent, column 7, Table 5) with respect to appearance, color change, and gloss resistance. Contrary to the statements in the Office Action, persons skilled in the art are led away from the adipic acid to an alicyclic dicarboxylic acid, which is taught as essential by the '613 patent. A person skilled in the art would have predicted *poor* results from using adipic acid after reading the '613 patent. Applicants unexpectedly found the opposite.

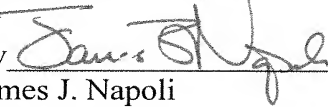
It is submitted that all claims are in a form and scope for allowance. An early and favorable action on the merits is respectfully requested.



Should the examiner wish to discuss the foregoing, or any matter of form in an effort to advance this application toward allowance, the examiner is urged to telephone the undersigned at the indicated number.

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Respectfully submitted,

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